What is claimed is:

1. A method of fabricating a damascene structure, comprising:

(a) forming a barrier layer on a substrate having a metal layer thereon;

(b) forming a first organosilicate layer on the barrier layer;

(c) forming a silicon oxide layer on the first organosilicate layer;

(d) forming a second organosilicate layer on the silicon oxide layer; and

(e) etching the second organosilicate layer to define vias therein, wherein the organosilicate layer is etched with a hydrogen-containing fluorocarbon gas mixture.

2. The method of claim 1, further comprising:

(f) etching the silicon oxide layer to transfer the vias defined in the second organosilicate layer therethrough;

(g) patterning the second organosilicate layer to define interconnects therethrough, wherein the interconnects are positioned over the vias, and wherein the via pattern is transferred through the first organosilicate layer when the interconnects are defined in the second organosilicate layer; and

(g) filling the vias and interconnects with a conductive material.

3. The method of claim 2 wherein the interconnects are defined in the second organosilicate layer and the vias are defined in the first organosilicate layer using a hydrogen-containing fluorocarbon gas mixture.

4. The method of claim 2 wherein the conductive material filling the vias and interconnects is selected from the group of copper (Cu), aluminum (Al), tungsten (W), and combinations thereof.

5. The method of claim 1 wherein the hydrogen-containing

fluorocarbon gas mixture includes one or more gases selected from the group consisting of trifluoromethane (CHF_3), difluoromethane (CH_2F_2), and fluoromethane (CH_3F).

6. The method of claim 5 wherein the hydrogen-containing fluorocarbon gas mixture further comprises a gas selected from the group consisting of carbon tetrafluoride (CF_4) and fluoroethane (C_2F_6).

7. The method of claim 5 wherein the hydrogen-containing fluorocarbon gas mixture further includes one or more gases selected from the group consisting of hydrogen (H_2), nitrogen (N_2), oxygen (O_2), argon (Ar), and helium (He).

8. The method of claim 1 wherein the second organosilicate layer is etched at a temperature within a range of about -20 ^{0}C to about 80 ^{0}C.

9. The method of claim 1 wherein the second organosilicate layer is etched at a pressure within a range of about 5 mtorr to about 1 torr.

10. The method of claim 1, further comprising applying an electric field to the hydrogen-containing fluorocarbon gas mixture.

11. The method of claim 10 wherein the electric field is a radio frequency (RF) power.

12. The method of claim 11 wherein the RF power is within a range of about 1 watt/cm^2 to about 100 watts/cm^2.

13. The method of claim 2 wherein the silicon oxide layer is etched with a fluorocarbon gas mixture.

14. The method of claim 13 wherein the fluorocarbon gas mixture

further comprises a gas selected from the group consisting of carbon tetrafluoride (CF_4) and fluoroethane (C_2F_6).

15. The method of claim 14 wherein the fluorocarbon gas mixture further includes one or more gases selected from the group consisting of hydrogen (H_2), nitrogen (N_2), oxygen (O_2), argon (Ar), and helium (He).

16. The method of claim 13 wherein the silicon oxide layer is etched at a temperature within a range of about -20 ^{0}C to about 80 ^{0}C.

17. The method of claim 13 wherein the silicon oxide layer is etched at a pressure within a range of about 5 mtorr to about 1 torr.

18. The method of claim 13 further comprising applying an electric field to the fluorocarbon gas mixture.

19. The method of claim 18 wherein the electric field is a radio frequency (RF) power.

20. The method of claim 19 wherein the RF power is within a range of about 1 watt/cm^2 to about 100 watts/cm^2.